Package ‘AID’

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Author Osman Dag, Ozgur Asar, Ozlem Ilk
Maintainer Osman Dag <osman.dag@hacettepe.edu.tr>
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AID-package

Estimation of Box-Cox Power Transformation Parameter

Description

Power transformation parameter is estimated for different purposes.

Details
AADT

**Description**

Average annual daily traffic data collected from the Minnesota Department of Transportation database.

**Usage**

`data(AADT)`

**Format**

A data frame with 121 observations on the following 8 variables.

- `aadt`  average annual daily traffic for a section of road
- `ctypop` population of county
- `lanes`  number of lanes in the section of road
- `width`  width of the section of road (in feet)
- `control`  a factor with levels: 1 = access control; 2 = no access control
- `class`  a factor with levels: 1 = rural interstate; 2 = rural noninterstate; 3 = urban interstate; 4 = urban noninterstate
- `truck` availability situation of road section to trucks
- `locale`  a factor with levels: 1 = rural; 2 = urban, population <= 50,000; 3 = urban, population > 50,000

**References**


Examples

data(AADT)
attach(AADT)
hist(aadt)
boxcoxfr(aadt, class)

boxcoxfr  A Function to Estimate Box-Cox Transformation Parameter for Comparing Two or More Groups

Description

boxcoxfr estimates Box-Cox power transformation parameter. It is useful to use if the normality or/and the homogenity of variance is/are not satisfied while comparing two or more groups. While estimating transformation parameter, maximum likelihood estimation in feasible region (MLEFR) is used. MLEFR maximizes the likehood function in feasible region constructed by Shapiro-Wilk test and Bartlett’s test. After transformation parameter is estimated, normality of groups and homogenity of variance are checked by Shapiro-Wilk test and Bartlett’s test, respectively.

Usage

boxcoxfr(y, x, option = "both", lam = seq(-2, 2, 0.02), alpha = 0.05)

Arguments

y a numeric vector of data values.
x a vector or factor object which gives the group for the corresponding elements of y.
option a character string to select the desired option for the objective of transformation. "norm" and "var" are the options which search for a transformation to satisfy the normality of groups and the homogenity of variances, respectively. "both" is the option which searches for a transformation to satisfy both the normality of groups and the homogenity of variances. Default is set to "both".
lam a vector which includes the sequence of feasible lambda values. Default is set to (-2, 2) with increment 0.02.
alpha the significance level for the construction of feasible region.

Value

Returns a list containing following elements:

method method applied in the algorithm
date date which the function is used
lambda.hat the estimated lambda
shapiro.test a matrix which gives the test results for the normality of groups via shapiro.test
bartlett.test a matrix which returns the test result for the homogenity of variance via bartlett.test
boxcoxnc

Author(s)

Osman Dag, Ozlem Ilk

References


Examples

data = rnorm(120, 10, 1)
factor = rep(c("X", "Y", "Z"), each = 40)
boxcoxfr(data, factor, lam = seq(-3, 3, 0.01))

Description

boxcoxnc utilizes seven different normality tests and artifical covariate method to estimate Box-Cox power transformation parameter and provides graphical analysis


Usage

boxcoxnc(data, method="all", lam=seq(-2,2,0.01), plotit=TRUE, rep=30, p.method="BY")

Arguments

data is a vector, matrix for univariate dataset
method  expects a character string to select the desired method to be used to estimate Box-Cox transformation parameter. To use Shapiro-Wilk test method should be set to "sw". For method = "ad", boxcoxnc function uses Anderson-Darling test to estimate Box-Cox transformation parameter. Similarly, method should be set to "cvm", "pt", "sf", "lt", "jb", "ac" to use Cramer-von Mises, Pearson Chi-square, Shapiro-Francia, Lilliefors, Jarque-Bera tests and artificial covariate method, respectively. To use all the methods at the same time, default is set to method = "all".

lam  is a vector which includes the sequence of candidate lambda values. Default is set to (-2,2) with increment 0.01

plotit plots normality test statistic vs lambda for methods utilizing normality tests. It also plots log-likelihood vs lambda for artificial covariate method. Defaults plotit = TRUE

rep  is an integer which denotes the replication number for artificial covariate method. Default is set to 30

p.method  expects a character string which defines the method to adjust the p-values. Default is set to "BY". p.method is same with the "method" in p.adjust documentation. See the documentation of p.adjust for other possible choices of methods and details.

Value

Returns a matrix of output with the results of seven different normality tests and artificial covariate method. The first row of the matrix corresponds to the related estimates of lambda. The subsequent rows correspond to the p-values of different normality tests for each estimates of lambda.

Author(s)

Osman Dag, Ozgur Asar, Ozlem Ilk

References


grades

Examples

```r
data(textile)
boxcoxnc(textile[,1])
boxcoxnc(textile[,1])$result[1,1]
```

grades Student Grades Data

Description

Overall student grades for a class taught by Dr. Ozlem Ilk

Usage

```r
data(grades)
```

Format

A data frame with 42 observations on the following variable.

grades a numeric vector for the student grades

Examples

```r
data(grades)
hist(grades[,1])
boxcoxnc(grades[,1])
```

textile Textile Data

Description

Number of Cycles to Failure of Worsted Yarn

Usage

```r
data(textile)
```

Format

A data frame with 27 observations on the following variable.

textile a numeric vector for the number of cycles
References


Examples

data(textile)
hist(textile[,1])
boxcoxnc(textile[,1])
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